

ceived from the R. I. Geological Institute and R. I. Geographical Society of Vienna, dated Oct. 1860; from the A. Antiquarian Society, dated Worcester, Aug. 9; the Botanical Society of Canada, dated Kingston, Aug. 9; the Connecticut and New Jersey Historical Societies, dated Aug. 9, 1861.

Donations for the Library were received from the Holland Society at Harlem; the Royal Astronomical Society at London; the Astor Library; the New York State Library and State University; the Philadelphia Academy of Natural Sciences, and publishers of the Medical News; the Smithsonian Institution, and American Colonization Society; the editors of Silliman's Journal of Arts and Sciences at New Haven; Beriah Botfield, of Cambridge, England; and Dr. Dorr, of Philadelphia.

The committee on Dr. Hayden's paper reported in favor of its publication in the Transactions. On motion of Dr. Bache it was so ordered.

Dr. Coates, in behalf of the committee on Dr. Tafel's paper, made an informal report, and the committee was continued.

Dr. Bache exhibited and described a spectroscope which he had just received from London.

The minutes of the last meeting of the Board of Officers and Council were read.

Pending nominations Nos. 423, 424 were read.

On motion of Dr. Bache the recommendation of the committee in regard to completing the printing of the Catalogue was adopted.

And the Society was adjourned.

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*Stated Meeting, September 20, 1861.*

Present, seven members.

Professor CRESSON, Vice-President, in the Chair.

Letters acknowledging publications were received from the Essex Institute, Salem, Mass., dated Aug. 16; the Lyceum

of Natural History, New York, dated Sept. 16; the trustees of the New York State Library, dated Aug. 24; the Historical Society at Chicago, dated Aug. 30, 1861.

A letter announcing the transmission of publications was received from the Royal Academy of Madrid, dated July 15.

A letter requesting correspondence and exchanges was received from Mr. T. A. Cheney, librarian of the Georgie Library, at Leon, Cattaraugus County, New York, dated Sept. 10, 1861.

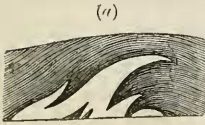
Donations for the Library were received from Prof. Paolo Volpicelli, of Rome; from the Royal Observatory at Cadiz; from the Royal Asiatic, the Chemical, and the Royal Geographical Societies, in London; from the Boston Society of Natural History; from the Entomological Society and Franklin Institute, of Philadelphia; from the editors of the *Astronomical Journal*, *American Journal*, and *Medical News and Library*; from Mr. Lorin Blodget, Mr. George Ord, and Dr. J. Aitkin Meigs, of Philadelphia.

The committee on Prof. Tafel's paper reported progress, through the chairman, Dr. Coates.

Mr. Lesley described the structure of a primary limestone bed on the Brandywine above Chad's ford, in illustration of the tongue-structure of folded anticlinals.

This exhibition of crystalline limestone is made at and above water-level in a quarry, worked to the depth of between one and two hundred feet, in from the original face of the cliff, and terminated by vertical walls of thirty or forty feet in height. In the floor of the quarry, at water-level, are seen two rude walls of quartzite left standing. These are *apparently* horses of quartz rock in the mass of the limestone. In the walls of the quarry are seen similar lens-shaped masses of quartz fringed in some cases with mica slate. A grand semicylindrical mass of quartz forms part of the wall-heading; and another plate of quartz rock overhangs the edge of limestone seen on the right at the floor level. Judging by the general irregularity of the exposure, taken in connection with the few outcrops of serpentine and marble, in the midst of generally steep or vertically dipping strata of primary slates and sandstones, in this region (south of the Chester County Valley), one might carelessly pass by this exposure as if it were merely, what it is apparently, some crushed layers

of primary or crystalline limestone mixed up with seams of quartzite and mica slate. But when carefully examined it turns out to be an exposure of the summit of a sharp anticlinal axis, of that order which is so common in much-disturbed regions of all ages, and especially worthy of study in the narrow basins of the coal. A diagram (a)

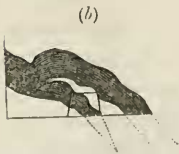


will show this structure better than any description. The masses of quartzite and mica slate in the walls of the quarry are inverted tongues of the roof-rock, and the apparent horsebacks in the floor are the points of corresponding tongues of the floor-rock.

The occurrence of such cases of fork-tongued anticlinal structure in so obscure a region as that of the Trenton-Philadelphia-Baltimore primary rocks, is important in the present state of our knowledge of this difficult region. No good field analysis of its structure has yet been made. The Final Report of the Geological Survey of the State gives no satisfactory account of it, enters into no details, and acknowledges that the colored limits of the formations upon the map were traced in great measure by conjecture. The mere appearance or outcrop of a primary limestone bed anywhere in this region would be a happy accident, and should be used as a clue to the structure in the way Sir William Logan has used the outcrops of limestone in Canada for working out the structure of the Laurentian formations.

But *the rise and fall in anticlinal* of a limestone bed among these altered sandstones and magnesian slates is much more important and suggestive, both in reference to the general interpretation of the dips of the region and in reference to the sub- or super-position of the Chester County limestone, which to appearance passes underneath the southern hills in the direction of this fork-tongued anticlinal of limestone,—but which most of the Pennsylvania geologists have regarded as a Lower Silurian synclinal with its southern slope overturned so as to make a south dip where a north dip ought to be.

In itself the shape of this anticlinal is curious enough and strictly analogous not only to those in the coal, a specimen of which is given in figure (b), but also to innumerable cases in the gneiss around Philadelphia. Just after entering Fairmount Park and ascending the river road to what was once Pratt's mansion, the horizontal streaks of quartz in the gneiss are seen to form a series of closed zigzags of the same kind. A far more extensive and extraordinary system of these plait-



ings of quartz veins in primary schists and in vertical posture may be studied in the first rock-cutting north of Old York Station on the North Pennsylvania Railroad, about eight miles out of town. In this latter case the quartz seams are perfect for so great a length, and the curves are so sharp, unbroken, close, and numerous, that one is tempted to give up further search for evidence against the possibility of any kind of igneous origin for them; while it is equally evident that the curvature was effected after infiltration, but before the present rock-crystal condition of the seams had been assumed; that is, while the quartz had as yet a quasi gelatinous consistency. Some of these seams of an inch in thickness, now packed up in a space three yards high by one yard broad, would if stretched out straight measure ten or twenty yards in length.

Pending nominations Nos. 423, 424 were read.  
And the Society was adjourned.

*Stated Meeting, October 4, 1861.*

Present, six members.

Dr. FRANKLIN BACHE in the Chair.

Letters were received from the corporation of Yale College, dated Sept. 1861; the Boston Public Library, dated Oct. 1. 1861; and from Mr. J. W. Nystrom, in relation to a new system of arithmetic, weights, measures, and coins.

Donations for the Library were received from the London Zoological Society, the Boston Public Library, the Medical News, Prof. Cresson, and the Chevalier Bonghi of Naples.

The MS. of Mr. Nystrom was referred to a committee, consisting of Mr. Dubois, Prof. Kendall, and Prof. Cresson.

Pending nominations 423, 424 were read.

The resignation of Dr. J. J. Reese was accepted.

And the Society was adjourned.